User's manual

Dosing- Controller

DC 155

Manual DC155_v2.0.16.doc

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Zertifiziertes Qualitäts-Managementsystem nach DIN EN ISO 9001

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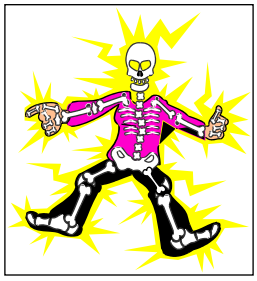
1 Operation instruction for Explosion protected control panels



Application and Standards

This instruction manual applies to explosion protected control panels of type of protection types below. This apparatus is only to be used as defined and meets requirements of EN 60 079 particularly EN60 079-14 "electrical apparatus for potentiality explosive atmospheres". It can be used in hazardous locations which are hazardous due to gases and vapours according to the explosion group and temperature class as stipulated on the type label. When installing and operating the explosion protected distribution and control panels the respective nationally valid regulations and requirements are to be observed.

General Instructions

The control panel has to have a back-up fuse as stipulated. The mains connection must have a sufficient short circuit current to ensure safe breaking of the fuse. To achieve an impeccable and safety device operation, please take care for adept transportation, storage and mounting, as well as accurate service and maintenance. Operation of this device should only be implemented by authorised persons and in strict accordance with local safety standards. The electrical data on the type label and if applicable, the "special conditions" of the test certificate PTB 98 ATEX 2071 are to be observed.

For outdoor installation it is recommended to protect the explosion protected distribution and control panel against direct climatic influence, e.g. with a protective roof. The maximum ambient temperature is 40°C, if not stipulated otherwise.

Intrinsically Safe Circuits

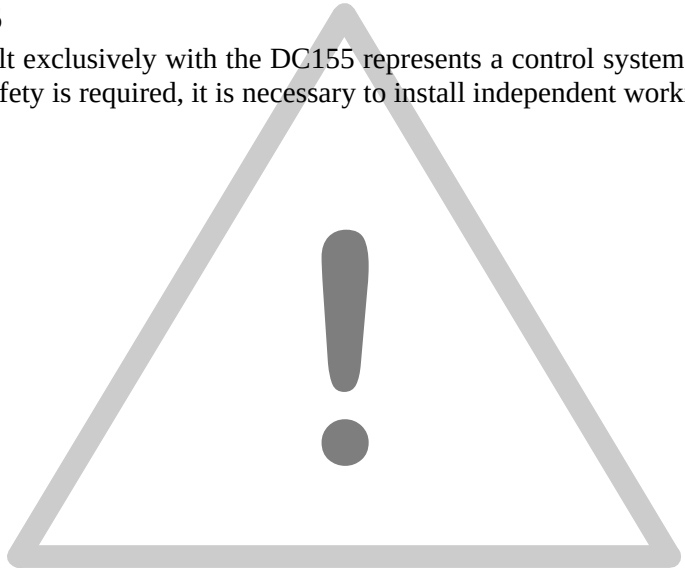
Erection instructions in the testing certificates of intrinsically safe apparatus are to be observed. The electrical safety values stipulated on the type label must not be exceeded in the intrinsically safe circuit. When interconnecting intrinsically safe circuits it is to be tested, whether a voltage and/or current addition occurs. The intrinsic safety of interconnected circuits is to be ensured. (EN 60079-14, section 12)

Safety Measures: to read and to comply

Work on electrical installations and apparatus in operation is generally forbidden in hazardous locations, with the exception of intrinsically safe circuits. In special cases work can be done on non-intrinsically safe circuits, on the condition that during the duration of such work no explosive atmosphere exists. Only explosion protected certified measuring instruments may be used to ensure that the apparatus is voltage-free. Grounding and short circuiting may only be carried out, if there is no explosion hazard at the grounding or short circuit connection.

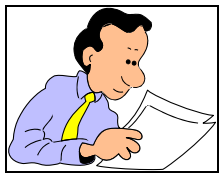
Safety aspects

A batch control system built exclusively with the DC155 represents a control system in category 1 according EN954-1. If a higher safety is required, it is necessary to install independent working safety facilities.



2 Introduction: Dosing - controllerDC155

The following chapter 2 shows the whole functionality of the DC155, sorted by subject. Important hints for mounting, installation and starting are introduced in chapter 3. A short intro for structuring and parameter input of the DC155, as well as the complete functionality of the front keys and the display can be found in chapter 4.



2.1 Short description

The dosing controller DC155 is an all purpose dosing control device to manage batch controlling of any arbitrary liquids or solid products inside the hazardous area. Advantages of this device are:

- simply handling, an orderly key pad containing big (22 x 22 mm) keys,
- a large graphic display and a
- flexible wide functionality.

The DC155 can manage simple as well as complex dosing applications inside hazardous area, without a extensive wiring to a DCS. See advantages below:

Several Input sources	It is possible to connect any common transmitter: NAMUR or 24V digital inputs are the standard input terminals, 4 up to 20 mA input as an option.
γ -factor Temperature compensation	The additional Pt100- input terminal allows a temperature compensation, if the space expansion factor γ of the dosing product is known and not neglectible.
Intelligent dosing features	The intelligent dosing program of the DC155 prevents shocks on the pipe system using a continuos raise and fall ramp by the 4 up to 20 mA – proportional valve output, as well as using a pair of fine and coarse valve.
Intelligent batch monitoring	Furthermore the DC155 includes a trouble alarm system to report flow disturbances or sensor failures. Obviously, the flow monitoring can be delayed to prevent wrong alarm during the start and finish period of the batch.
Simply remote control	The DC155 has several digital control inputs to realise a simple remote control with the basic functions like “START, STOP and RESET”.
Powerful analogous output	The analogous output can manage a load of 600 Ω directly. The optional separate supply extend the load up to 1000 Ω.
PID-controlled Dosing process	Some applications need a regulation of the flow during the batch process. The option “regulated analogous output” can manage this applications with an internal PID- controller.
Data safety	The data is stored on an onboard EEPROM, if the power supply fails. The DC155 continues at the restored state, when the mains is back.

2.2 Basics

2.2.1 Units for preset, sum counter and flow

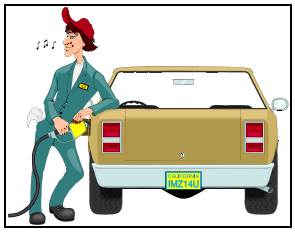
The first step to configure the DC155 is to define the physical unit for preset, sum counter and flow. Therefore sufficient unit symbols are implemented into the DC155 (e.g. gram (g), kilogram (kg), tons (t), liter (l) etc.) To define the flow several time units are available.

2.2.2 Impulse value, analogous input scaling

The DC155 get its information about the present flow via impulse or an analogous signal from a flow sensor. If it is a impulse signal, you have to define the value of one impulse to get the right amount of flow.

If the sensor signal is an analogous signal, you have to define the maximum flow (e.g. 1000 kg/min) for 20 mA.

The Impulse value and analogous input scaling is located in the structure menu in the input category.



2.3 Dosing applications

Generally, a batch control system content a flow measuring, one or two valves and the batch controller.

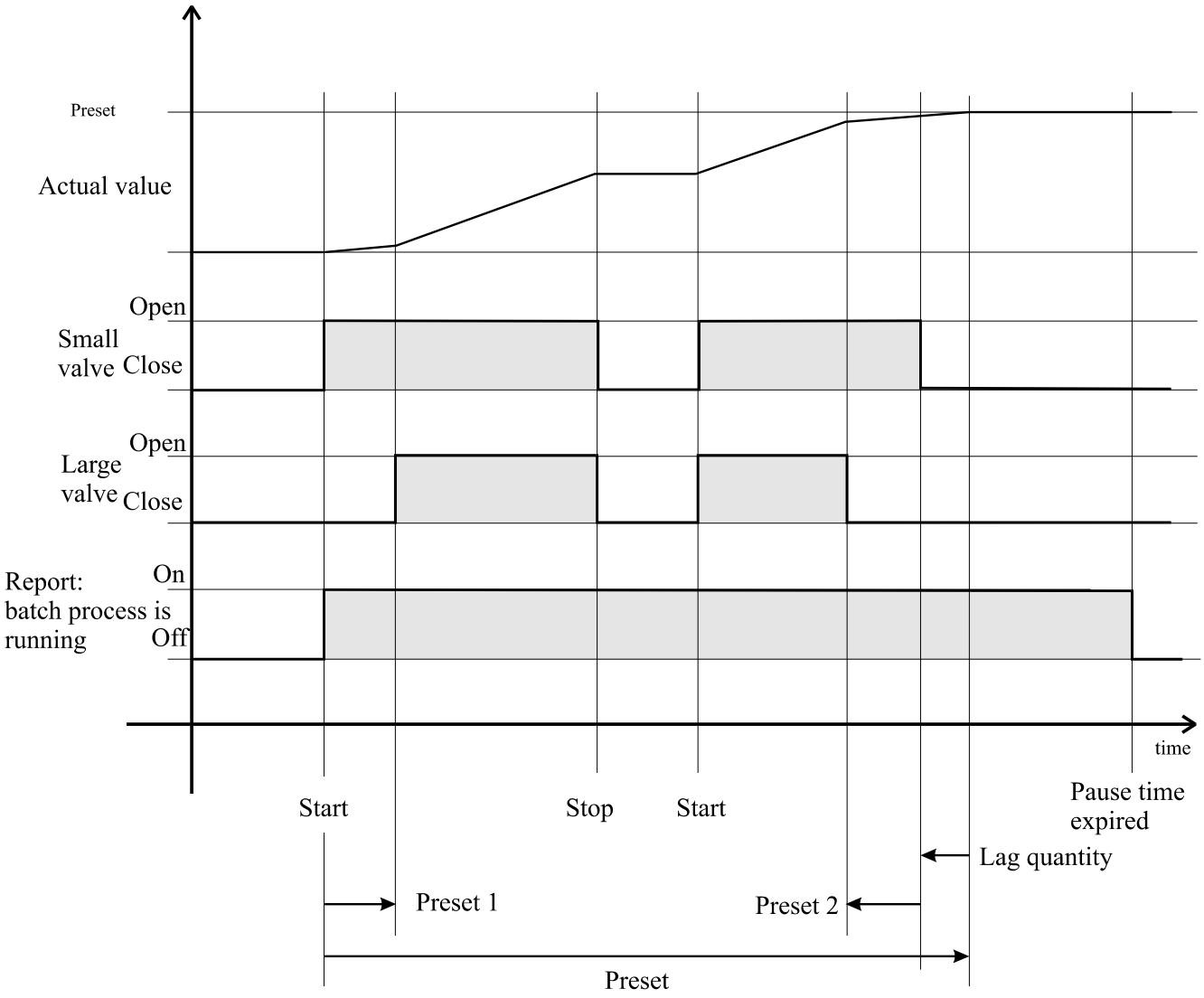
The flow sensor measures the quantity of the product per time, which flows into the target bowl and sends this information to the batch controller. The controller receive the flow information, integrates the flow signal to a sum, compares the sum continuously with the preset and controls the connected actors, which themselves controls the flow into the target bowl.

The DC155 **supports many sensor signals**: 24V active/passive, NAMUR, 4 ..20 mA (analogous current signal) and several actors. The following application examples are sorted by the kind of actors:

2.3.1 Dosing control using digital solenoid valves

The most common dosing application is the batch control using a coarse and fine valve. When the batch process is starting both valves open – a big flow of the product starts to flow. Before the preset is reached (at preset minus preset 2) the coarse valve shuts and the remain quantity will be added very exactly.

Additional it is possible to configure a opening delay of the coarse valve (preset 1) and a lag quantity to take care of the pipe system and to get the exact desired quantity. See the following time diagram to understand the function of these.



Beside it is possible to define a **maximum preset**, to allow only equal or smaller presets to be set.

The DC155 has **three free programmable digital outputs**. In the example above two of them must be reserved for valve control. The following figure shows any possible function of a digital output.

```
Select the function of digital output
1:

0. No function
1. Counter = 0
2. Fine valve
3. Wide valve
4. Dosing is running
5. Any failure
6. Flow too small
7. Flow too big
8. Impulses
↵. End
```

Figure 1 Digital output functions

Function	Description (definition: output in normal open connection)
1. Counter = 0	The digital output is closed, if the actual value is equal to zero. Otherwise the digital is the digital output open.
2. Fine valve	control output for a valve with a fine cross section in normal closed connection. Also the control output for a single valve.
3. Wide valve	control output for a valve with a wide cross section in normal closed connection
4. Dosing is running	The output is closed, as long the preset valve is not reached and the pause time is not expired. Otherwise the digital is the output open. See also the time diagram above.
5. Any failure	The output is closed, as long any disturbance (broken wire, flow to big, etc) is occurring to the DC155 or failure is no more present, but not acknowledged. Otherwise the digital is the digital output open.
6. Flow to small	The output is closed, as long the flow rate is too small or this failure is not acknowledged. Otherwise the digital is the digital output open.
7. Flow too big	The output is closed, as long the flow rate is too big or this failure is not acknowledged. Otherwise the digital is the digital output open.
8. Impulses	Flow proportional signal: the output gives one pulse for any increase of the actual value.

Table 1:function list of digital output

The total quantity of various batch processes is stored by an additional **sum counter**. The sum counter is shown permanently at the bottom of the display. Obviously, the sum counter gets no reset after each batch. So, it provides information about the dosed product for several batches or over a longer period of time.

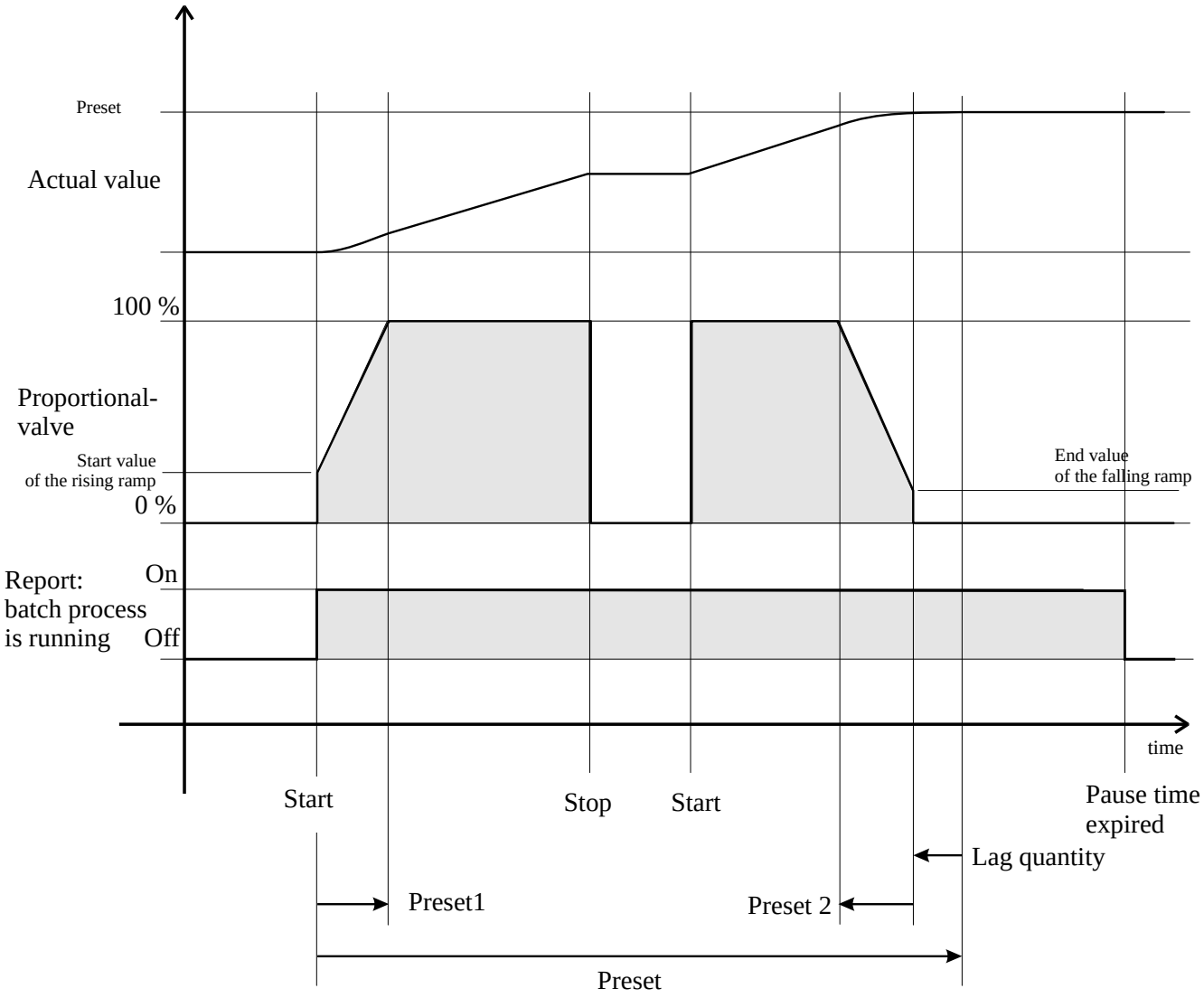
Furthermore it is possible to realise a **very simple batch control using only one digital solenoid valve.** In this case you have to configure the single valve as a **fine valve**. Consider, the parameters like preset 1 and preset 2 (but not lag quantity !) lose their functions.

2.3.2 Dosing control with proportional (analogous) valve

The DC155 can content **a 4 ..20 mA analogous output** to control a proportional solenoid valve as an option. The batch control parameters as shown above have by this actor version the same function. Consider the following diagram for details.

You can configure the analogous output to a **0 ..20 mA** or to a **4 ..20 mA signal**. To get the functionality as shown in the diagram just configure the analogous output to **“ Ramp shape”**.

It is possible to adjust the shape of the ramp. The parameter category shows at the menu item 'analogous output' the parameter **'Limit for analogous output'** for limiting the maximum shape of the ramp as well as the **‘start value of the rising ramp’** and the **'End value of the falling ramp'** to adjust the end value of the falling shape to 0% up to 100 %.



You can configure the analogous output to a **0 ..20 mA** or to a **4 ..20 mA signal**. To get the functionality as shown in the diagram just configure the analogous output to **" Ramp shape"**.

Any **alternative functions for the analogous output** are shown below:

```
Select the function of the analogous  out-
put:

0. No function
1. Flow prop. signal
2. Ramp shape
3. Flow feedback control
4. Counter p. sig.
5. Counter (max) p. sig.
↵. End
```

Figure 2 Functions of the analogous output

Function	Description (definition: output in normal open connection)
1. Flow prop. signal	The analogous output is proportional to the actual flow 0/3 mA = 0 l/s; 20 mA = max. flow. Define max flow in the input menu
2. Ramp shape	The analogous output deals with a proportional working solenoid valve. See working diagram above
3. Flow feedback control	The analogous output deals with a proportional working solenoid valve and flow rate control
4. Flow prop. Signal	The analogous output shows the actual batch amount (0/4 mA = 0%; 20 mA = 100%)
5. Counter (max) p. sig.	The analogous output shows the actual batch amount (0/4 mA = 0%; 20 mA = max. setpoint)

2.3.3 Simultaneously Flow and batch control (Option)

The DC155 has an internal PID- flow controller as an option. See item 3 of figure 2 above. With this option the DC155 is a batch controller and a PID- flow controller in one device. The batch controller fills up the desired volume and the flow controller regulates the medium flow to the predefined setpoint flow during the batch process. The setpoint flow has also a ramp shape as shown above. The dynamical behaviour of the feedback flow controller can be adjusted with the common PID parameter set Kp, Ki and Kd located in the parameter category.

Like the uncontrolled output, the preset 1 and preset 2 defines a ramp shape of the analogous output to limit the slew rate. Set maximum output, if required, in item "Analogous output" in the parameter menu.

2.3.4 Batch control with absolute level signal (requires 4.. 20mA analogous input option)

This kind of batch control works not with a flow signal, but with an absolute level signal. The dosing process remains the same.

2.3.5 Forward - backward Impulse counter (requires 2 Impulse inputs option)

Some kinds of flow sensors (e. g. windmill-type anemometer) recognises back flows. These have two sensors. The DC155 can determinate the flow direction using the phase relation of the two sensors.

Configuration and handling of the DC155 with this option is equal to any standard application.

2.4 Creep suppression

In some cases, it is necessary to ignore a transductor signal bigger than 4 mA. This threshold level is called creep suppression value. The figure on the right hand shows its function.

Adjust the creep suppression value in the structure category.

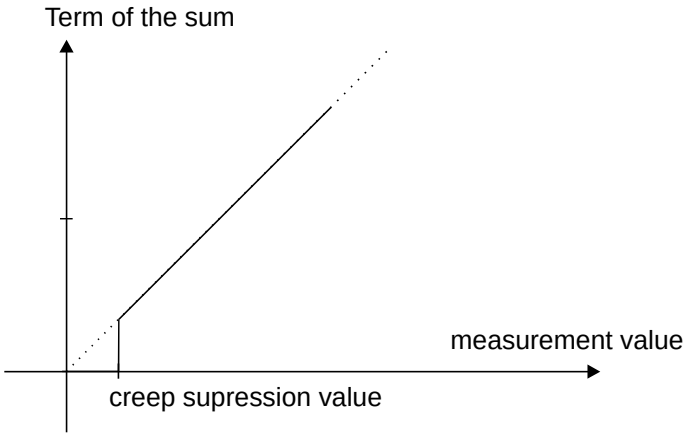
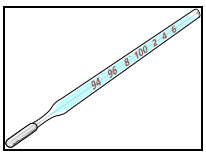


Figure 3: creep suppression



2.5 Temperature compensation (requires Pt100- option)

Any fluid has a specific **expansion coefficient γ**, i.e. in general, the volume of the fluid increases with its temperature. So using a volume measurement sensor for a mass dosing application, introduces an inaccuracy into the dosing process, if the temperature changes. This inaccuracy is not neglectible for big γ .

In this cases utilise the temperature compensation of the DC155, to compensate the expansion coefficient of the fluid. The DC155 corrects the density of the medium according the following formula:

$$\rho = \rho[1-\gamma(\vartheta-\vartheta_R)]$$

with

ρ: density,

γ: expansion coefficient,

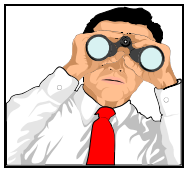
ϑ: actual Medium temperature

ϑ_R: reference temperature

For this the DC155 measures the temperature of the fluid via the Pt100 input. Further requirement are the expansion coefficient of the fluid and the reference temperature. See the category below:

```
Settings for temperature compensation

0. Temperature compensation: active
1. Reference temperature:   20°C
2. Coeff. of expansion:: 0.00 E-3 1/K
↵. End
```



2.6 Process monitoring

A batch process can be interrupted by several disturbances and errors. Even if a dosing error is inevitable, it is preferable that in any case an alarm indicates the cause. Please consider beside the following monitoring features description the batch process flow chart in chapter 4.4.

2.6.1 Broken wire monitoring

The analogous 4 ..20 mA signal as well as the NAMUR- signal have according to their specification a **„LIVE-ZERO“- attribute**, i.e. the signal quality "zero" is dissimilar to its physical zero quality. So, it is possible to a recognise rip off or a destruction of sensor wiring.

If a sensor wire brakes, then the DC155 interrupts the batch process and **indicates "Broken wire" on the display**. It is possible to report the "Broken wire" disturbance via a any digital output.

Acknowledge the disturbance status by pressing the **RESET- key**. A second push on the **RESET- key resets the DC155 batch counter to zero**. Alternative it is possible to **continue the batch process** by pressing the **START- key**.

2.6.2 Flow monitoring

Flow fluctuations are considerable disturbances particularly if a reactor will be filled simultaneously with several substances or the flow exceeds the flow sensor limits.

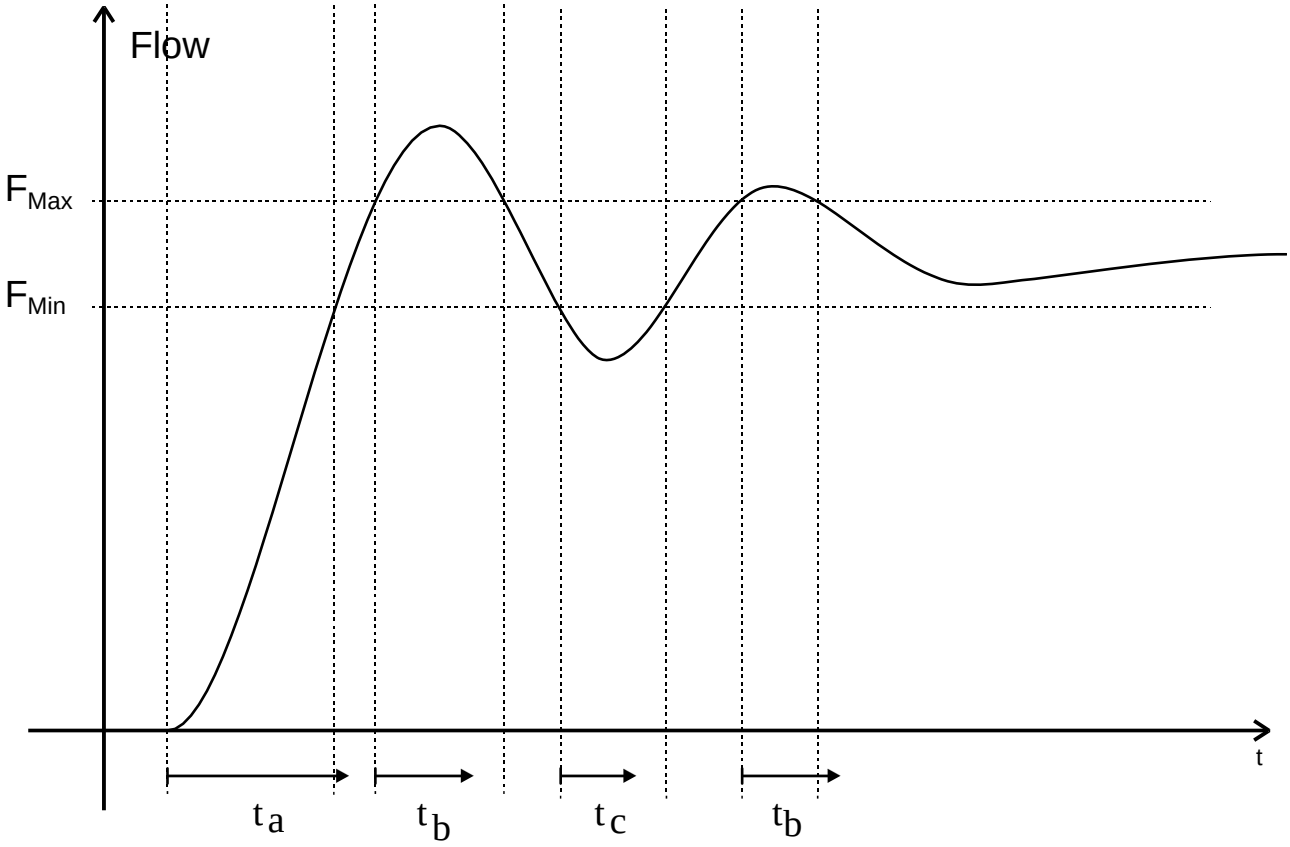
The DC155 can monitor min and max flow limits. If flow exceeds limits, the DC155 interrupts the batch process after a programmed time delay and indicates the disturbance on the display. It is possible to report the disturbance via any digital output.

The figure 4 shows an example of a flow at start of a batch. The delay times are as follows:

t_a, : General delay

t_b : Selective delay at F > F max

t_c : Selective delay at F < F min



The general delay starts on the begin of batch – the selective delays starts in that moment the flow exceeds its limit. If the flow did not return when the delay time is over the corresponding alarm causes.

Acknowledge the disturbance status by pressing the **RESET- key**. A further push on the **RESET- key resets the DC155 batch counter to zero**. Alternative it is possible to **continue the batch process** by pressing the **START- key**.

2.7 Safety

Thoughtlessness and carelessness of unauthorised people are often the cause of failures of total automatic dosing systems. We took measures on the DC155 to prevent unintentional or incompetent interruptions to the dosing process.

2.7.1 Code words

The competence to enter or manipulate configuration or parameter settings are divided into 3 safety levels:

1. The **lowest level** is the competence **to change the preset**. The authorised persons, who know the code word 'preset' are able to change the preset not more. **The ex works preset code word is '0001'**. If this lowest safety level is not necessary, so **disable the preset code word** by setting it to '0000'.
2. The **medium safety level** is the competence to **enter the parameter category**. In this category it is possible to enter or to change all remaining batch parameter like preset 1, preset 2, lag quantity, pause time, flow limits, limits delay, PID-controller parameter and the internal time clock as well as to reset the sum counter. **The ex works preset code word is '0002'**. The parameter category pass word can not be disabled by setting it to '0000'. The medium safety level is dedicated e.g. to maintenance personal.
3. The highest safety level is the competence to enter the structure category. In this category it is possible to change the entire structure (configuration) of the DC155 (e.g. type of unities, input signal, output signal, indication, temperature compensation, flow monitoring, key blocking) as well as changing code words. **The ex works preset code word is '0003'**. The structure category pass word can not be disabled by setting it to '0000'. The highest safety level is dedicated e.g. to the plant engineer.

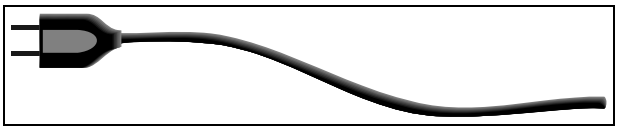
2.7.2 Key locking

In some applications the DC155 works total automatically, e.g. on remote to a DCS, without any manual control. In this cases, it will be practical to block the keys of the DC155 to prevent an unauthorised intervention.

The DC155 has three level of key locking as follows:

1. Any key is enabled
2. Any key is locked, except the START,STOP and RESET keys
3. Any key is locked

After the configuration, the **key locking is active**, if the **key lock signal input (terminal 15) is high.**



2.8 Remote control / bus coupling

The DC155 has several interfaces to realise remote control.

2.8.1 Remote control via digital inputs

The DC155 has five predefined digital signal inputs (**START, STOP, RESET, INHIBIT and KEY LOCK**) to realise a simple remote control with passive switches or to a high level control system (e.g. DCS).

The threshold of the inputs is **Low- Signal < 2 V and High- Signal > 5 V**

Any signal inputs except the STOP input are fix predefined in normal open connection, **the STOP input is predefined in normal closed connection**.

2.8.2 TTY- interface and protocol print (Option)

A quite more elegant kind of remote control is via a DCS and ESC -sequences. See the instruction codes in the following table

Instruction code	**Function**
ESC 0	Request for counter (present value) state
ESC S	START- instruction
ESC P	STOP- instruction
ESC Z	RESET- instruction
ESC K1	Enable keys
ESC K0	Lock keys
ESC B *PRESET*	Set preset (e.g. *PRESET* = 001000)
ACK (hex. 06)	Answer to a known instruction
NAK (hex. 15)	Answer to a unknown instruction

The DC155 answers with a **complete batch protocol print** (contents date, time, preset amount, real (finish) amount), if the protocol print is enabled (Menu/structure/TTY interface) and it gets the '**ESC Z' instruction.**

2.8.3 Modbus (Option)

a) Registers

The modbus interface uses only "Holding Registers" to submit measurement values and commands. The registers are defined as below:

Register (Hex)	Access	Data format	Function
40001	R/W R/W R/W R R R R R R R R	Bit field	Ctrl-Flags: Bit 0: Start Dosing process Bit 1: Stop Dosing process Bit 2: Reset Counter Info-Flags: Bit 8: Dosing process is started Bit 9: Dosing process is stopped Bit 10: Counter is equal to zero Bit 11: Broken wire Sensor 1 Bit 12: Broken wire Sensor 2 Bit 13: minimum flow rate alarm Bit 14: maximum flow rate alarm Bit 15 Counter overflow
40002	R/W	Floating point	Preset
40003			
40004	R	Floating point	Actual value
40005			
40006	R	Floating point	Flow rate
40007			

Remarks

- The „Read only“ marked Bits in Register 40001 are write protected i.e. ignore these bits while writing in this register. Write using the function 16 „Preset Multiple Registers“ and write the registers 40002 and 40003 simultaneously, otherwise the DC155 would not recognise the new preset.

- After writing a new preset into the registers 40002 and 40003, the DC155 will take the new preset at the **next** dosing process (not to the running dosing process).

b) Functions

The DC155 supports the Modbus functions below:

Function number	Function
3	Read Holding Registers
6	Preset Single Register
16	Preset Multiple Registers

a) Hardware

The DC155 uses Modbus RTU, 9600 Baud, supports TTY only. The parity can be set to even, odd or inactive.

2.9 Calibrated version, batch result print out

The calibrated batch system contents:

1. Batch controller DC155.X.X.X.X.4.X.X
2. Supply and interface module VI156.X.1.X
3. Calibrated sensor
4. Actor
5. Calibrated printer, interface protocol according DIN 66258

2.9.1 Supply and interface module VI156.X.1.X

The Supply and interface module VI156.X.1.X is an Ex- interface module with 3 digital working inputs, 2 digital working outputs and serial interface. It works in hazardous area zone 1 with the DC155. Besides the VI156 feeds the DC155 with Ex i- Energy.

2.9.2 Calibrated sensor, setting for redundant sensor wire

A calibrated batch process needs a calibrated sensor. If this sensor has terminals for 2 pulse outputs signals, so connect both to the DC155. Please configure the redundant sensor input in the Input menu of the DC155 for accurate working.

The DC155 will show “Sensor failure !” if the wiring is not ok. After fixing the error quit the failure message by pressing the “RESET” button on the front. A second press the “RESET” will restart the batch process.

2.9.3 Actor(s)

The VI156 has 2 internal Ex i to Ex e- relay terminals. So user can connect Ex e- actors like motors, pumps or valves direct in hazardous area.

2.9.4 Central printer for several batch control stations

Use a “Auto data switcher” in safe area to connect several batch controller to one printer.

Enter a individual header in each DC155 to separate the prints.

2.9.5 Additional Settings on DC155

a) Menu blocking of the calibrated DC155

The menu of the DC155 must be protected against unauthorised manipulation especially by calibrated process. For this reason there must be a cable bridge inside of the DC155 to enter the menu of the DC155.

To enter structure menu must

the correct code word be entered and put a wire bridge between terminal 3 and 16

b) Print out

For a calibrated batch process the batch data must printed out. For this enable “Print protocol” iun the Configuration of the DC155.

The print out shows:

```
[Infotext]

[Date]          [Time]          [Set-point]       [Actual Value]
```

c) Info text

With the info text field you can set a individual text on the print out. The text length is 20 characters at maximum. The text can be entered in menu “TTY- interface”, choosing “info text”. A list with all available characters are shown. Select a character with the arrow buttons and put it into text with the enter button.

Delete wrong characters with “<” and confirm the info text with ↵.

```
Input the infotext:
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789.
> ↵

Batch position 1
```

2.10 Scale signal amplifier connection

The combination of the dosing controller DC155 and the scale signal amplifier WV157 is a dosing system which works with a scale signal in hazardous area. The personnel starts the batch per „start“ key on the DC155. The growing weight of the good is recognised by a scale (working with a strain gauge). When the preselected weight is reached the DC155 stops the filling process automatically. The DC155 works with a decreasing weight signal too.

The scale signal amplifier is used to transform the weight signal. The small difference signal of the strain gauge will be amplified, transformed to digital and sent to the Dosing controller.

Correct mounting of the WV157 in hazardous area is close to the scale to reduce disturbances. The even more disturbance safe digital output signal can be transmitted via a longer distance to the DC155 in hazardous area.

For further information see manual WV157.

2.10.1 Connection WV157

Connect the WV157 to terminal 27 to 29

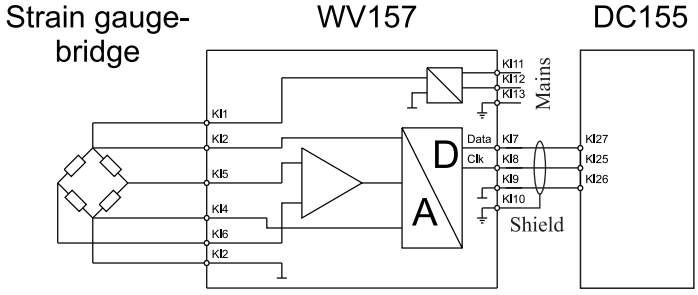


Figure 4 Connection of WV157

2.10.2 Scale menu / manual settings

The scale menu contents all settings of the load cell and the scale amplifier. A calibration procedure can complete parameters, if some parameter are unknown.

```
Settings for dosing with balance
0. Weight rises while dosing
1. Measuring range
2. Zero cal.
3. Tare              : Auto
4. Koeff. cal.       : Ja

5. Max. load cell    : 10kg
6. Gain of WV157: 1d/mV
7. Balance signal    : 0.200mV/V
8. Balance signal is : positive
9. End
```

Function	Description
0. Weight rises while dosing	The weight will rise while batch procedure, alternative the weight can fall while batch procedure
1. Measure range	Sets the maximum span of the scale
2. Zero cal.	Set the signal immediate to zero
3. Tare	Automatic tare means that the scale signal is define to zero at the start moment

4. Koeff. cal.	Choose “Yes” If you have the parameters of the load cell shown below. If not choose “No” and make a calibration
5. Max. load cell	Maximum weight of the load cell
6. Gain of WV157	Adjustment of the gain of the load cell
7. Balance signal	Output signal / sensibility of the load cell
8. Balance signal is	Polarity of the output signal of the load cell

2.10.3 Scale calibration

Are the parameters of the scale and load cell unknown – choose “No” at “Koeff. Ca.” (item 4). The menu will change immediately to the screen below.

To calibrate the scale system: load cell, scale signal amplifier WV157 and DC155 a calibrated weight is needed. First make a zero calibration (item 2) with the unloaded scale. Then enter the amount of the weight load the scale (item 5) and load the scale with the weight and choose item 6. The calibration is done.

```
Settings for dosing with balance
0. Weight rises while dosing
1. Measuring range
2. Zero cal.
3. Tare              : Auto
4. Koeff. cal.       : No

5. Calibration point  : 10 kg
6. Load cal.
7. End
```

3 Installation and connection

3.1 Mounting

The DC155 is dedicated for mounting and working in hazardous area zone 1. Please use the 4 holes on the rear plate for mounting and use a solid base.

NB **Observe local safety guidelines and the regulative VDE DIN 57 165**

See hole distances below:

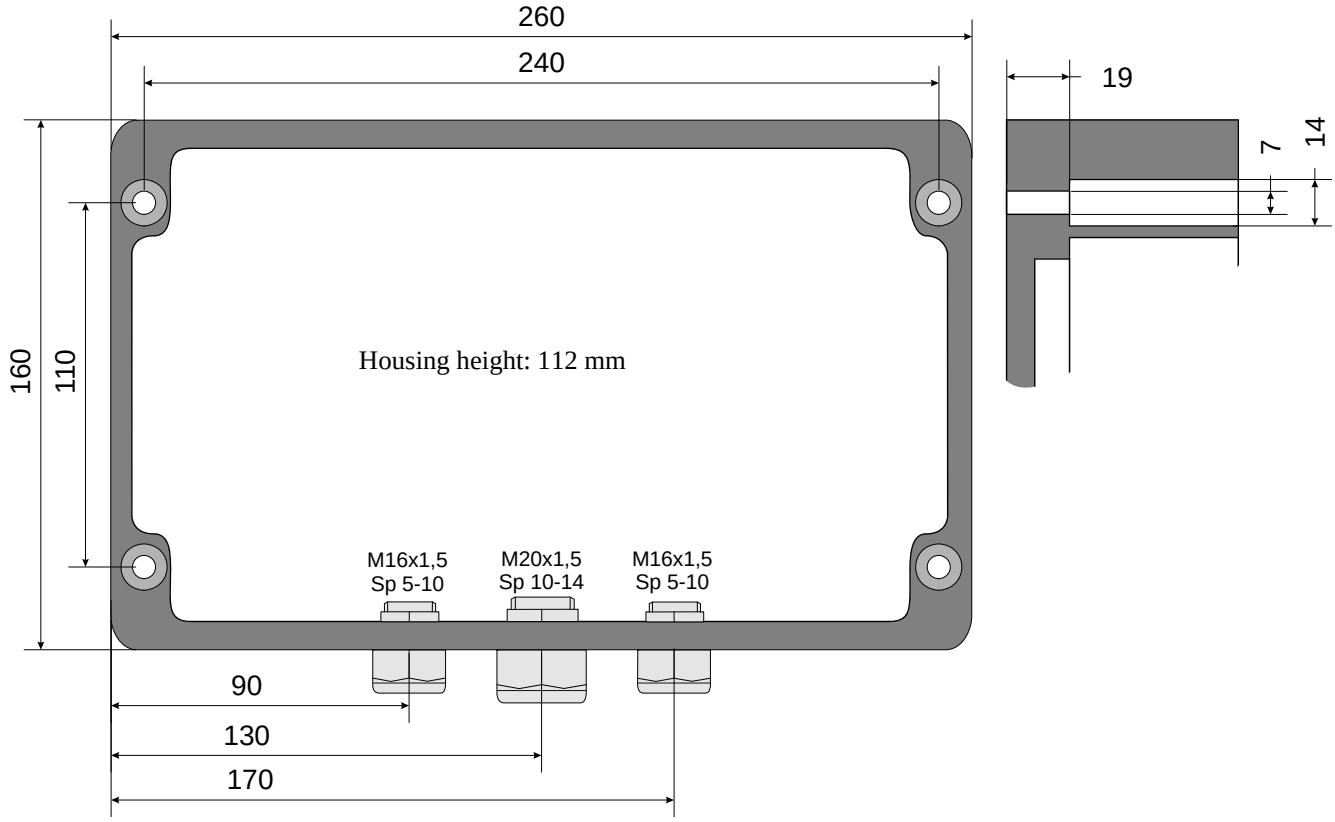


Figure 5: Dimensions

3.2 Wiring

NB **Please note the following Standard of Compliance: PTB 98 ATEX 2071 and the regulative VDE DIN 57 165**

Warning **Do not exceed terminal safety limits of any terminal.**
See terminal limits on table 5.4 in the annex or the standard of compliance PTB 98 ATEX 2071

3.2.1 Terminal description DC155

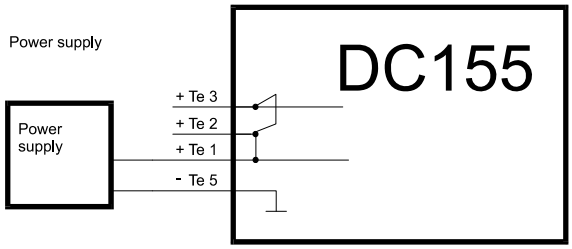
Terminal	Description
1,2 + 5,6 -	Power supply input
3 +	Power supply input/ Option: separate power supply for analogous ouput
4 +	supply output for NAMUR- Sensors
7 -	Connect only to a NAMUR sensor supplied on terminal 4
8 +	Input for 24V impulses
9 -	Connect only to a NAMUR sensor supplied on terminal 4
10 +	Input for 24V impulses
11,12,13,14,15,16	Digital inputs (11-16: START, STOP, RESET, INHIBIT and key lock)
17+ 19+ 21+ 18- 20- 22-	Digital output
23+ 24-	Analogous inputs
27, 28, 29	Digital interface to scale amplifier WV157
29+ 30-	Analogous output
31 +, 32 , 33 34-	Terminal for PT100, 4 wire connection
35+ 36-	TTY- receiver
37+ 38-	TTY- transmitter

NB **The digital input 'STOP' is a normal closed connection. For that reason please put a shorting bridge on terminal 2 to terminal 12, If you don't use the external 'STOP'**

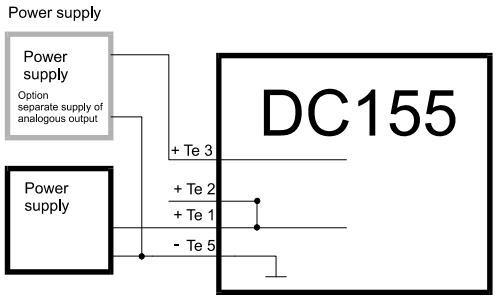
See block diagram of DC155 terminals and the electrical safety limits in the annex.

3.2.2 Power supply

a) Standard

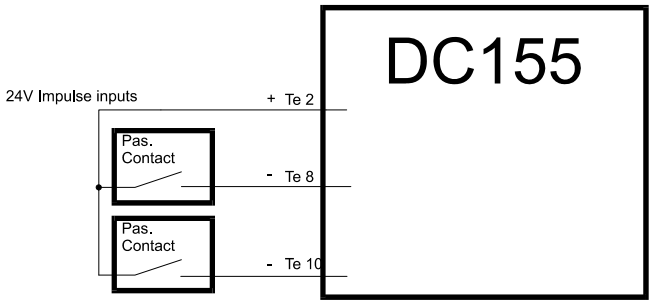


b) Separate power supply of analogous output

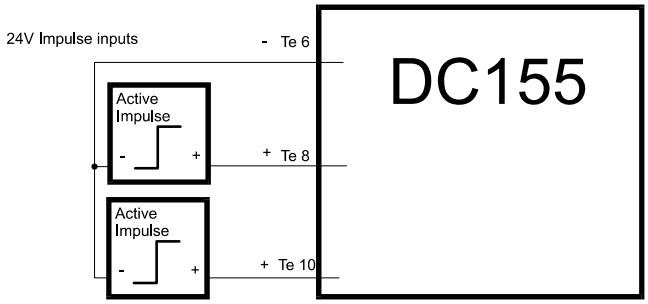


3.2.3 Sensor terminals

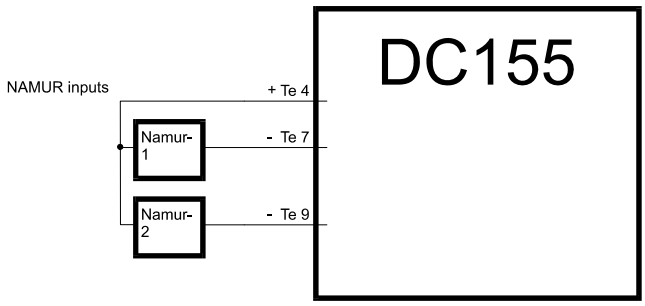
a) 24V Impulses passive



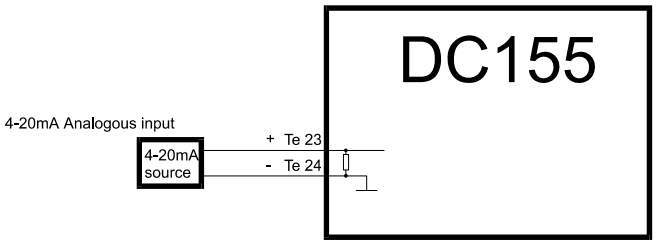
b) 24V Impulses active



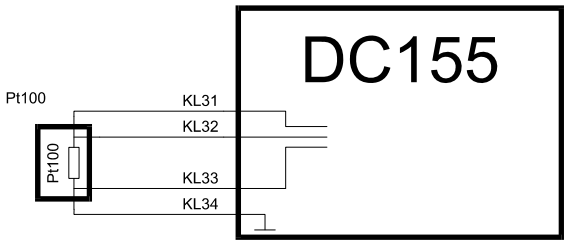
c) NAMUR- Signal



d) 4-20 mA Signal



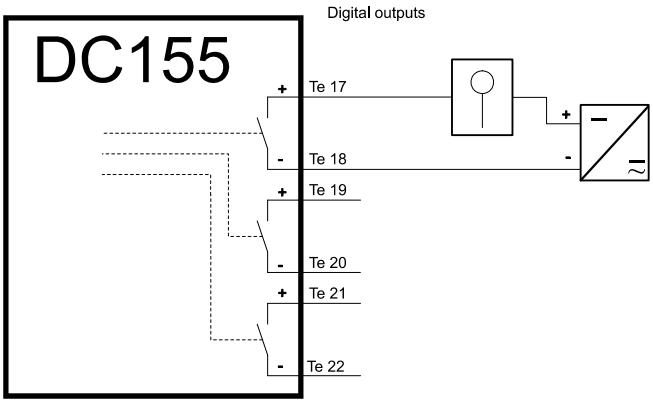
e) Pt100 terminal (4-wire connection)



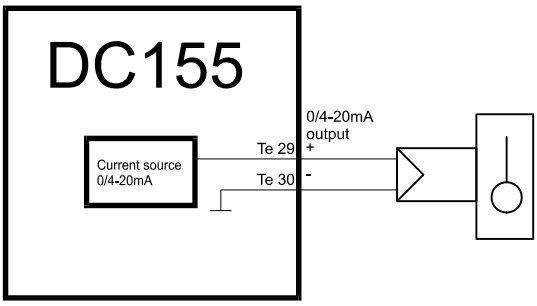
(NB: a Pt100 3-wire connection is not possible)

3.2.4 Actor terminals

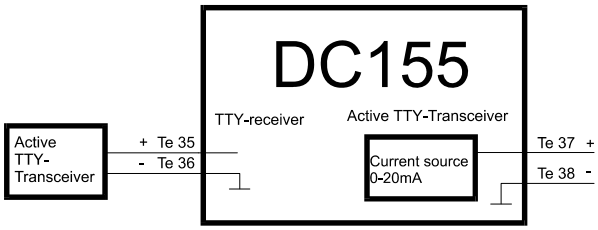
a) Digital outputs



b) Analogous 0/4-20 mA output



3.2.5 TTY- interface



3.3 Power supply of DC155

3.3.1 Application inside hazardous area

The DC155 needs an **intrinsically safe** power supply with the maximal values of U_0 = 30 V, I_k = 160 mA.

The **power consumption** of the DC155 **depends on the kind and count of additional options**. The **basic power consumption** of the DC155 (Type code = DC155.x.0.0.x.0.0.x) is about **300 mW**.

The power consumption is increased by any energy consuming option. For the total power consumption of the DC155 see the table below.

Alternative to one powerful power supply you can distribute the power requisites to 2 less powerful power supplies (e.g. a transmitter power supply on your stock), if you ordered a DC155 with separate power supply of analogous output. Please see table below for details.

Hardware- Configuration Of DC155		**Power request to power supply**		
		Standard	**separate feeding**	
		SG	SG 1 (terminal 1 and 5)	SG 2 (terminal 3 and 6)
Minimal configuration DC155.x.0.0.x.0.0.x		U ≥ 15 V, I ≥ 20 mA impedance ≥ 750 Ω	-	-
	+ analogous output DC155.x.a.0.x.0.0.x a = {1, 2}	U ≥ 15 V, I ≥ 20 + 20 = 40 mA impedance ≥ 375 Ω	U ≥ 15 V, I ≥ 20 mA impedance ≥ 750 Ω	U ≥ 15 V, I ≥ 20 mA impedance ≥ 750 Ω
	+ TTY- interface DC155.x.0.0.x.a.0.x a = {1, 3}	U ≥ 15 V, I ≥ 20 + 20 = 40 mA impedance ≥ 375 Ω	U ≥ 15 V, I ≥ 20 mA impedance ≥ 750 Ω	U ≥ 15 V, I ≥ 20 mA impedance ≥ 750 Ω
	+ 2. NAMUR- input DC155.x.0.1.x.0.0.x	U ≥ 15 V, I ≥ 20 + 6 = 26 mA	-	-
Example- configuration: DC155 + 2. NAMUR input + TTY-interface DC155.0.0.1.0.3.0.x		U ≥ 15 V, I ≥ 20 + 20 + 6 = 46 mA	U ≥ 15 V, I ≥ 20 + 6 = 26 mA	U ≥ 15 V, I ≥ 20 mA impedance ≥ 750 Ω

3.3.2 DC155 for safe area application

If you use the DC155 for safe area application and no wire of the DC155 lead into hazardous area, then you can supply the DC155 direct from a 24V DC net. It is no power supply device necessary.

3.4 Starting, parameter default settings

The following table shows the parameter settings defaults. These basic defaults exist on each DC155. The parameter count can increase by any additional option.

1. category	2. category	Parameter	Value	Comment
Language		German, English, French, Dutch		
Structure	Units	Preset: Sum counter: Flow:	000000. l 000000000. l 0000.00 l/s	
	Input	24V- Input		

		Impulse value Max. flow	1.00000 l 10.00 l/s	
	output	Dig. output 1 Dig. output 2 Dig. output 3 Dig. output 1 Dig. output 2 Dig. output 3	No function No function No function normal closed normal closed normal closed	 Alternative Normal open
	Flow monitoring		Inactive	
	Display	Upper display lower display	Preset Actual value	
	Key locking		Key enabled	Any key is active
Parameter	Presets	Preset preset 1 preset 2 lag quantity Maximum preset	000000. l 000000. l 000000. l 000000. l 999999. l	
	Pause time	Pause time	0 s	
	date time		07.01.1996 0:00	
Codes		Preset Parameter Structure	0001 0002 0003	

3.5 Reset

Reset **Reset the DC155 to its ex work configuration as follows: press the 'RESET' key while you're switching on the power supply to the DC155.**

After a reset the display shows:

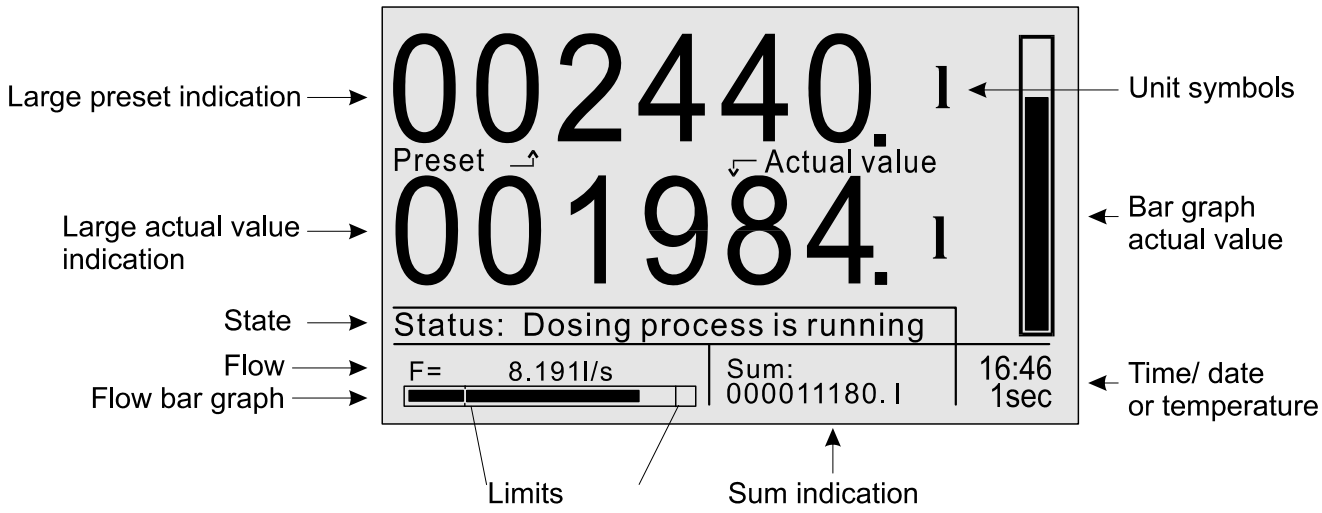
```
THE DC155 was reseted, all parameters
are cleared,
It is necessary to reconfigurate the
DC155 !!!
Press any key ...
```

4 Operation manual

The user has a total control of the DC155 by the use of the front keys respectively a restricted control via a suitable remote control.

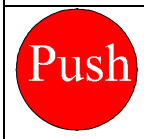
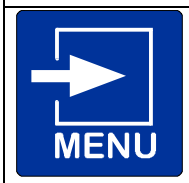
4.1 LC-Display

The graphical display of the DC155 contents 2 big variable text fields and further text and graphic elements, which appear when the configuration is done. On the display any important process data is visible.



4.2 Keyboard

The DC155 contents 14 keys and a STOP- switch, for complete configuration, parameter changing and manual operation. The functions of any key are listed below.

Key	Name	State	Function
	STOP-Switch	1. During dosing process 2. Else	Valves are closed immediately, dosing process is interrupted None
	START- key	1. Dosing process stopped / ready 2. While menu input	Dosing process continues / starts, valves are opened Cursor shift left
	RESET- key	1. Dosing process finished / stopped 2. During power on process DC155 3. While menu input	Resets actual value Activates configuration reset, any parameter is set to ex works values Cursor shift right
	SET- key	1. In operation 2. Else	Sets the preset value None
	INFO- key	1. In operation 2. While menu input	Toggle between High-level status view of the dosing process and direct input/output view The figure '0'
	ENTER- key	1. In operation 2. While menu input	Starts structure and parameter menu (Code word is necessary) Confirms input / return to upper category
	Figure keys	1. In operation	No function

		2. While running menu 3. While figure input	Select menu item X Choosing the figure X

4.3 Parameter input and Configuration

It is not necessary to read the following section, if you want to go ahead quickly.

The configuration of the DC155 is divided into 3 categories. This structure is shown in chapter 3.4. This table is mentioned as a survey. See Chapter 2 for details.

N.B. **If you start the parameter or the structure menu category while a batch process is running, so the batch process will be broke immediately: the valves close, the actual value is reset to '0'.**

Press the ENTER- key to start parameter input. The ex works code word is '**0003**'. Confirm the code word input with the ENTER- key to enter main menu:

```
Main menu

0. Language
1 .Structure
2. Parameter
3. Codes

4. Reset sum counter
➔. End
```

4.3.1 Input assistance: blinking menu items

The first menu item (Language) blinks on the display (grey scale). The blinking of menu items means a input assistance sequence. If the user always edit the blinking menu item, then he can be sure that

1. **he won't forget or disregard any menu item, and**
2. **he configures the DC155 logical correct and efficient**.

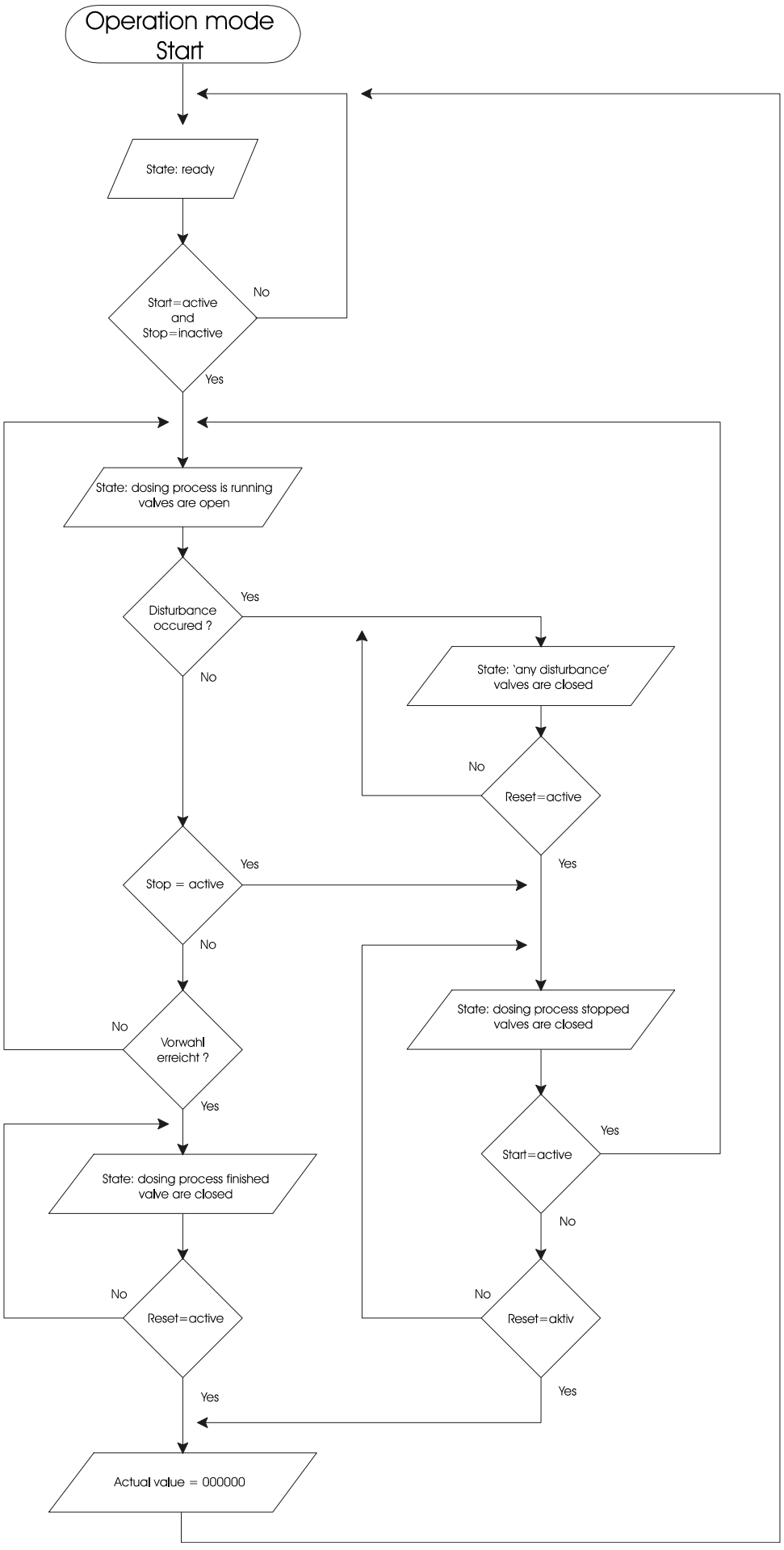
In any case it is possible to edit a non blinking category, e.g. just to change one configuration item.

Press the 'ENTER'- key to return from any menu category.

The configuration is finished , if the 'End'- menu item blinks. Please press the 'ENTER'-key to return to dosing operation, with a new configuration.

4.4 Dosing control flow chart

The following flow chart shows the idle loop of the dosing control. Consider that pressing the 'ENTER'-key and entering the right code word will terminate this procedure in any state. After returning to dosing operation the procedure starts on the start position.


Operation mode Start
State: ready
Start=active and Stop=inactive
No
Yes
State: dosing process is running valves are open
Disturbance occured ?
Yes
No
State: 'any disturbance' valves are closed
No
Reset=active
Yes
Stop = active
Yes
No
State: dosing process stopped valves are closed
No
Vorwahl erreicht ?
Yes
Start=active
Yes
No
State: dosing process finished valve are closed
No
Reset=active
No
Reset=aktiv
Yes
Yes
Actual value = 000000

5 Annex

5.1 Block diagram DC155

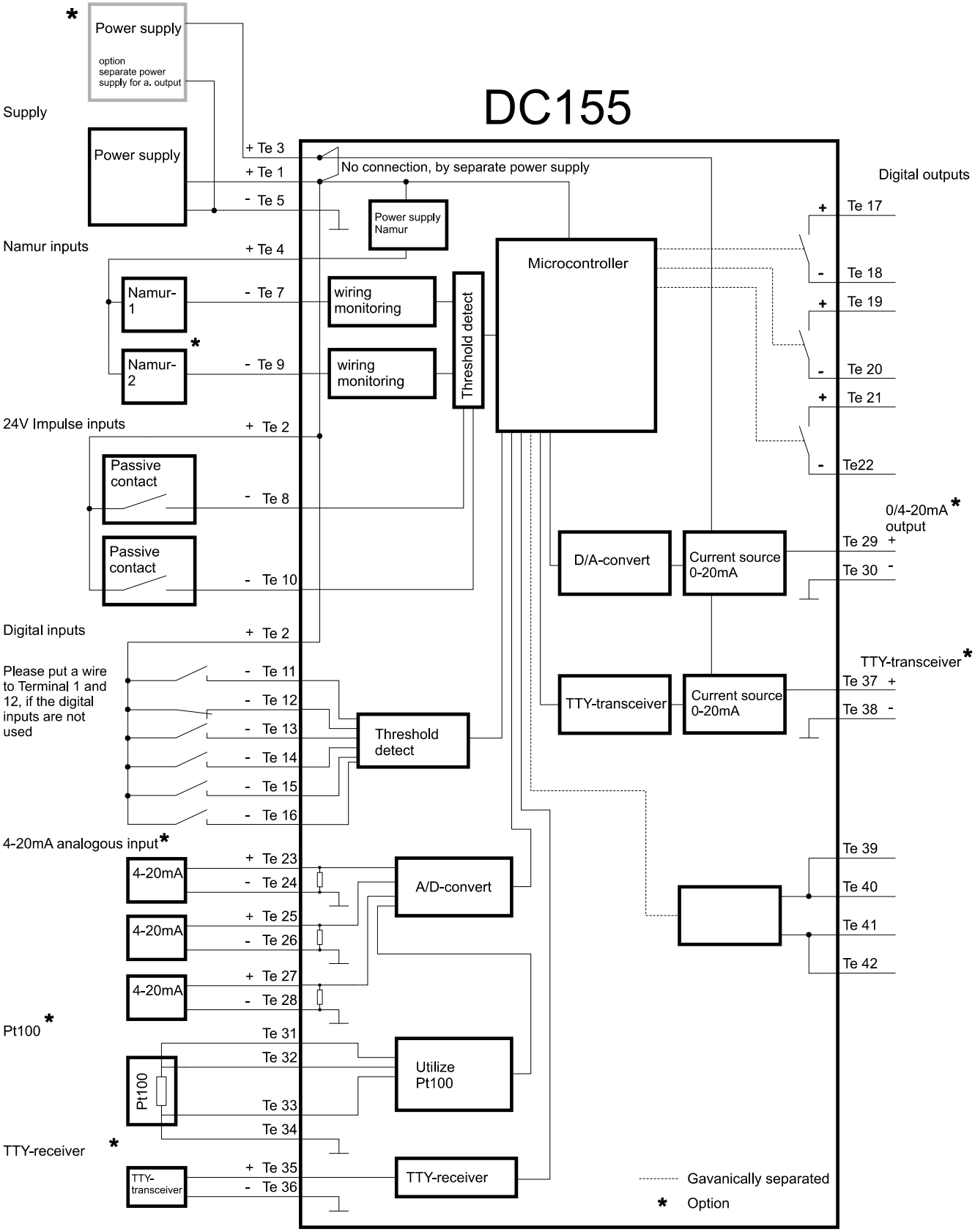


Figure 6 block diagram DC155

5.2 Technical Details

		Dosing controller DC155
General	Mounting	Inside hazardous area
	Ex-protection	E Ex ib IIC T6
	Housing protection class	IP65
Mounting	Ambient temperature	-10°C ...+45°C at T6 -10°C ...+65°C at T4
Housing	Dimensions	H x B x T: 160 mm x 260 mm x 112 mm
	Material	Aluminium lacquered / front foil: polyester
Electrical Specifications	Main voltage	Intrinsically safety E Ex ib IIC
	Power consumption	min.20 mA at 15V = 300 mW (without analogous output)
Inputs	NAMUR	Max input frequency: 2 kHz
	24V- Digital input	Threshold : 0-Signal: U < 2 V, 1- Signal: U > 5 V
	Analogous input	4-20 mA, load: 15 Ω
	Measuring error	< 0,2 %
	Temperature coefficient	< 0,01 % /K
Outputs	Digital output	3 intrinsically safe galvanically separated digital ouputs closed output remain voltage ≈ 2,5 V
	analogous output	4-20 mA, min 600 Ω, error < 0,2 % TK < 0,01 %/K
Power supply	minimum DC155.x.0.0.x.0.0.x	MUS with U ≥ 15 V, I ≥ 20 mA, load ≥ 750 Ω
	Additional analogous output	U ≥ 15 V, current delivery see above + 20 mA or using separate MUS : DC155.x.x.x.x.x.x.1
	Add.. TTY-interface	U ≥ 15 V, current delivery see above + 20 mA
	Add.. 2. NAMUR- input	U ≥ 15 V, current delivery see above + 6 mA
Ergonomy	Display	Graphical LC-Display
	Entering configuration	Menu guided languages: German, English, French, Dutch
	TTY-interface	Protocol print remote control via ESC- sequence
	Modus DP	Control, operate, Indicate with Bus- Interface

5.3 Type code

		DC155	.x	.x	.x	.x	.x	.x	.x
Analogous input	no analogous input		.0						
	One 4...20mA analogous input		.1						
Analogous output	no analogous output			.0					
	One 4...20mA analogous output			.1					
	PID controlled analogous output			.2					
NAMUR- input	NAMUR- input				.0				
	two NAMUR- inputs				.1				
Pt100- input:	no Pt100- input					.0			
	One Pt100- input					.1			
TTY- interface:	no interface						.0		
	TTY- transceiver						.1		
	TTY- transceiver and receiver						.2		
	TTY- receiver						.3		
Modbus-Interface	no bus PA interface							.0	
	with Modbus DP interface							.1	
Separate power supply For analogous output	no separate power supply								.0
	with separate power supply								.1

5.4 (Ex- safety) terminal maximum ratings

Inputs					
terminal	voltage	current	Power	C_i, L_i	Comment
1, 2	30V	160mA	2,5W	2nF, 5µH	power supply for DC155
3	30V	160mA	2,5W	2nF, 5µH	power supply for DC155or analogous output
7					Connect only to a NAMUR sensor in combination with terminal 4
8	60V	160mA		5µH	Input for voltage impulses
9					Connect only to a NAMUR sensor in combination with terminal 4
10	60V	160mA		5µH	Input for voltage impulses
11 ... 16	60V	160mA		5µH	Digital inputs, Impedance per input min. 25 kΩ
17, 18	30V	160mA	1,5W	5µH	Digital output
19, 20	30V	160mA	1,5W	5µH	Digital output
21, 22	30V	160mA	1,5W	5µH	Digital output
23, 25, 27	30V	160mA		5µH	Analogous input
32, 33					Connect only to a Pt100 sensor in combination with terminal 31
35	60V	160mA	1,25W	5µH	TTY- Receiver
5, 6, 24, 26, 28, 30, 34, 36, 38				5µH	Masse
39, 40, 41, 42	16V	160mA		5µH	Not used

Outputs					
terminal	voltage	current	Power	C_a, L_a	Comment
4	9,4V	21mA		3,8µF, 30mH	Power supply for MANUR sensors. The maximum power (with terminal 7 or 9) is 234 mW per sensor
29	see terminal 1	see terminal 1	see terminal 1	$C_{aSpeisekreis}$-12nF $L_{aSpeisekreis}$-10µH	Analogous output
31	5,4V	6mA	8mW		Connect only to a Pt100 sensor
37	see terminal 1	see terminal 1	see terminal 1	$C_{aSpeisekreis}$-12nF $L_{aSpeisekreis}$-10µH	TTY-Transceiver

5.5 Documentation table

1.Category	2. Category	Parameter	value / choice	Comment
language		German	❑	
		English	❑	
		French	❑	
		Dutch	❑	
Structure	Units	preset	0 0 0 0 0 0	
		sum counter	0 0 0 0 0 0 0 0 0 0	
		flow	0 0 0 0 0 0	
	Batch control with absolute level signal		❑ active ❑ inactive	
		level during batch process	❑ decreases ❑ increases	
		level bei 4 mA		
		level bei 20 mA		
	Input	Type	❑ 24V- Input ❑ NAMUR ❑ 4-20 mA	
		Impulse value		
		4 mA correspond to		
		20 mA correspond to		
		Max. flow		
	Output	Dig. output 1		
		Dig. output 2		
		Dig. output 3		
		Dig. output 1	❑ normal open ❑ normal closed	
		Dig. output 2	❑ normal open ❑ normal closed	
		Dig. output 3	❑ normal open ❑ normal closed	
		Analogous output function	❑ 0-20 mA ❑ 4-20 mA	
		Analogous output function		
	Flow monitoring		❑ active | ❑ inactive	
	Temperature compensation		❑ active | ❑ inactive	
		reference temperature	°C	
		expansion coefficient	/K	
	Display	upper Display		
		lower display		
	TTY- interface	Baud rate		
		Bits		
		Parity		
		print protocol	(calibration only)	
		Eichfähiger Betrieb	(calibration only)	
		Swap float	(Modbus only)	
		Modbus adress	(Modbus only)	
	Key blocking		❑ inactive ❑ partial active ❑ total blocked	

Parameter	Presets	preset		
		preset 1		
		preset 2		
		lag quantity		
		Max. preset		
	PID controller	desired flow rate		
		Kp		
		Ki		
		Kd		
	Analogous output	Maximum value		
		Start value rising ramp		
		End value falling ramp		
	Flow monitoring	min. flow		
		max. flow		
		delay flow monitoring		
		delay for Q<Qmin		
		delay for Q>Qmax		
	Pause time	pause time		
Codes		Preset		
		Parameter		
		Structure		

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) # EG-Baumusterprüfbescheinigung

(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - **Richtlinie 94/9/EG**

(3) EG-Baumusterprüfbescheinigungsnummer

PTB 98 ATEX 2071

(4) Gerät: Dosiercontroller Typ DC 155

(5) Hersteller: Gönnheimer Elektronic GmbH

(6) Anschrift: Dr.-Julius-Leber-Str. 2, D-67433 Neustadt a.d. Weinstr.

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die Physikalisch-Technische Bundesanstalt bescheinigt als benannte Stelle Nr. 0102 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG) die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht PTB Ex 98-28014 festgelegt.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

EN 50014: 1997 **EN 50020: 1994**

(10) Falls das Zeichen „X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Bau des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes.

(12) Die Kennzeichnung des Gerätes muß die folgenden Angaben enthalten:

II 2 G EEx ib IIC T6

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 23.06.1998

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(13) # Anlage

(14) ## EG-Baumusterprüfbescheinigung PTB 98 ATEX 2071

(15) Beschreibung des Gerätes

Der Dosiercontroller Typ DC 155 wertet als Teil einer Dosiereinrichtung zum Abdosieren von Flüssigkeiten Signale eines Durchflußmessers aus und steuert entsprechende Dosierventile.

Die höchstzulässige Umgebungstemperatur beträgt für die Temperaturklasse T6 45 °C und für die Temperaturklasse T4 65 °C.

Elektrische Daten

Speisestromkreise (Klemmen 1/2, 5/6 bzw. 3, 5/6)

in Zündschutzart Eigensicherheit EEx ib IIC

nur zum Anschluß an bescheinigte eigensichere Stromkreise.

Höchstwerte: U_i = 30 V
I_i = 160 mA
P_i = 2,5 W

Die wirksamen inneren Reaktanzen betragen je Stromkreis: C_i = 2 nF
L_i = 10 µH

Sensorstromkreise (Klemmen 4, 7, 9)

in Zündschutzart Eigensicherheit EEx ib IIC

nur zum Anschluß eines NAMUR-Sensors

Höchstwerte: U_o = 9,4 V
(je Sensor) I_o = 21 mA
P_o = 24 mW

höchstzulässige äußere Induktivität: L_o = 30 mH
höchstzulässige äußere Kapazität: C_o = 3,8 µF

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Impulseingänge (Klemmen 8/10, 5/6, aktiv) (Klemmen 8/10, 1/2, passiv)	in Zündschutzart Eigensicherheit EEx ib IIC **Bei Anschluß an aktive Stromkreise gilt:** nur zum Anschluß an bescheinigte eigensichere Stromkreise. Höchstwerte: U_i = 60 V I_i = 160 mA Die wirksamen inneren Reaktanzen sind vernachlässigbar klein. **Bei Anschluß an passive Stromkreise gilt:** Die Höchstwerte entsprechen denen des Speisestromkreises.
Digitaleingänge (Klemmen 11 bis 16, 5/6, aktiv) (Klemmen 11 bis 16, 1/2, passiv)	in Zündschutzart Eigensicherheit EEx ib IIC **Bei Anschluß an aktive Stromkreise gilt:** nur zum Anschluß an bescheinigte eigensichere Stromkreise. Höchstwerte: U_i = 60 V I_i = 160 mA Die wirksamen inneren Reaktanzen sind vernachlässigbar klein. **Bei Anschluß an passive Stromkreise gilt:** Die Höchstwerte entsprechen denen des Speisestromkreises.
Digitalausgänge (Klemmen 17 bis 22)	in Zündschutzart Eigensicherheit EEx ib IIC nur zum Anschluß an bescheinigte eigensichere Stromkreise. Höchstwerte je Stromkreis: U_i = 30 V I_i = 160 mA P_i = 1,5 W Die wirksamen inneren Reaktanzen sind vernachlässigbar klein.

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Analogeingänge (Klemmen 23/24, 25/26, 27/28)	in Zündschutzart Eigensicherheit EEx ib IIC nur zum Anschluß an bescheinigte eigensichere Stromkreise. Höchstwerte: U_i = 30 V I_i = 160 mA Die wirksamen inneren Reaktanzen sind vernachlässigbar klein.
PT-100 Stromkreis (Klemmen 31 bis 34)	in Zündschutzart Eigensicherheit EEx ib IIC nur zur Speisung eines PT-100 Höchstwerte: U_o = 5,4 V I_o = 6 mA P_o = 8 mW
TTY-Eingang (Klemme 35, 36)	in Zündschutzart Eigensicherheit EEx ib IIC nur zum Anschluß an einen bescheinigten eigensicheren Stromkreis. Höchstwerte: U_i = 60 V I_i = 160 mA P_i = 1,25 W Die wirksamen inneren Reaktanzen sind vernachlässigbar klein.
TTY-Ausgang (Klemme 37/38)	in Zündschutzart Eigensicherheit EEx ib IIC Die Höchstwerte entsprechen denen des Speisestromkreises. Der Speisestromkreis, der Analogausgang und der TTY-Ausgang sind als durchverbunden zu betrachten. Die Werte für die höchstzulässigen äußeren Reaktanzen ergeben sich aus der Summe der L_o/C_o-Werte im Speisestromkreis und Analogausgang abzüglich 15 µH/14 nF.

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Profibus-PA Anschluß (Klemmen 39 bis 42)	in Zündschutzart Eigensicherheit EEx ib IIC Höchstwerte: U_i = 16 V I_i = 160 mA geeignet zum Anschluß an ein Feldbus-System entsprechend dem FISCO-Modell (z.B.: Profibus-PA).
Analogausgang (Klemme 29/30)	in Zündschutzart Eigensicherheit EEx ib IIC Der Speisestromkreis, der TTY-Ausgang und der Analogausgang sind als durchverbunden zu betrachten. Die Werte für die höchstzulässigen äußeren Reaktanzen ergeben sich aus der Summe der L_o/C_o-Werte im Speisestromkreis und TTY-Ausgang abzüglich 15 µH/14 nF.

Die Digitalausgänge und der Profibus-PA Anschluß sind von allen anderen Stromkreisen bis zu einem Scheitelwert der Nennspannung von 60 V sicher galvanisch getrennt.

(16) Prüfbericht PTB Ex 98-28014

(17) Besondere Bedingungen

Nicht zutreffend

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

Durch die vorgenannten Normen erfüllt.

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 23.06.1998

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. ERGÄNZUNG

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 98 ATEX 2071

Gerät: Dosiercontroller Typ DC 155

Kennzeichnung: Ⓔx **II 2 G EEx ib IIC T6**

Hersteller: Gönnheimer Elektronic GmbH

Anschrift: Dr.-Julius-Leber-Str. 2
D-67433 Neustadt a.d. Weinstr.

Beschreibung der Ergänzungen und Änderungen

Der Dosiercontroller Typ DC 155 darf künftig auch nach den im Prüfbericht aufgeführten Prüfungsunterlagen gefertigt und betrieben werden. Die Änderungen betreffen den Schaltungsaufbau des Gerätes sowie einen Teil der "Elektrischen Daten".

Diese ändern sich wie folgt:

Elektrische Daten

Analogeingang (Klemmen 23/24)	in Zündschutzart Eigensicherheit EEx ib IIC nur zum Anschluss an einen bescheinigten eigensicheren Stromkreis Höchstwerte: U_i = 30 V I_i = 160 mA L_i vernachlässigbar klein C_i vernachlässigbar klein

Ausführung DC155.2.x....
und DC155.3.x....

Analogeingänge (Klemmen 25/25, 27/28)	in Zündschutzart Eigensicherheit EEx ib IIC nur zum Anschluss an bescheinigte eigensichere Stromkreise Höchstwerte: U_i = 30 V I_i = 160 mA L_i vernachlässigbar klein C_i vernachlässigbar klein

EG-Baumusterprüfbescheinigungen ohne Unterschrift und ohne Siegel haben keine Gültigkeit.
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Braunschweig und Berlin

1. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 98 ATEX 2071

Ausführung DC155.4.x....

Serielle Schnittstelle (Klemmen 25/26, 27/28)	in Zündschutzart Eigensicherheit EEx ib IIC nur zum Anschluss an bescheinigte eigensichere Stromkreise Höchstwerte: U_i = 30 V I_i = 60 mA P_i = 19 mW L_i vernachlässigbar klein C_i vernachlässigbar klein

Die serielle Schnittstelle ist von allen anderen Stromkreisen bis zu einem Scheitelwert der Nennspannung von 60 V sicher galvanisch getrennt.

Alle übrigen "Elektrischen Daten" und Angaben der EG-Baumusterprüfbescheinigung gelten unverändert.

Prüfbericht: PTB Ex 01-21123

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 19. Juli 2001

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EG-Konformitätserklärung

Declaration of conformity / Déclaration de conformité

Communauté Européenne

Anbieter: *Supplier:* *Fournisseur:*	Gönnheimer Elektronic GmbH

Anschrift: *Address:* *Adresse:*	Gewerbegebiet Nachtweide Dr.-Julius-Leber-Straße 2 67433 Neustadt/Weinstraße

Produkt: *Product:* *Produit:*	DC155, Dosiercontroller

Das oben beschriebene Produkt erfüllt die Schutzanforderungen der folgenden EG-Richtlinien / the product described above complies with the following EG- rules / le produit décrit ci-dessus accomplit CU- réglementations

89/336/EWG, 93/68/EWG, 94/9/EG

und ist konform mit / and is in conformity with / et est conforme á:

EN 50014: 1997, Allgemeine Bestimmungen EN 50020: 1994, Eigensicherheit „i“ EN 61000-6-3: Fachgrundnorm Störaussendung; Teil 6-3: Wohnbereich, Geschäfts- und Gewerbebereiche sowie Kleinbetriebe EN 61000-6-2: Fachgrundnorm Störfestigkeit; Teil 6-2: Industriebereich DIN VDE 0106-100:1983, Schutz gegen elektrischen Schlag

zusätzliche Angaben / additional information / informations supplémentaires:

Qualitätsmanagement- System nach ISO EN DIN 9001 Anerkanntes Qualitätssicherungssystem nach Richtlinie 94/9/EG

EG- Baumusterprüfbescheinigung / EC- Type certification / Attestation d’examen ce de type

PTB 98 ATEX 2071

Diese Konformitätserklärung ist gültig für alle Produkte, die ab dem Datum der Unterzeichnung in Verkehr gebracht werden

Neustadt, den 03.11.2006

Gönnheimer (Geschäftsführer)